

Lecture Outline

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1. Commodities and Services

Previously we discussed the relationships between supply and demand, price and quantity demanded and quantity supplied, market equilibrium and public policy, and the concept of elasticity. In this chapter we turn our attention to the concept of consumer choice, that is, what are the foundations of consumer behavior.

Recall from our previous discussion in Chapters 1 and 2 that we can group items into two classifications: economic goods and economic bads.

Economic goods are any type of good, work, service that increases individual satisfaction. Economic bads, on the other hands, are any type of good, work, service that detracts from individual satisfaction.

We can further disaggregate economic goods into *consumer goods*, *capital goods*, *commodities*, and *services*.

Consumer goods directly enhance the satisfaction of an individual through direct consumption. Capital goods are those goods that indirectly increase individual satisfaction by enhancing our efficient use of productive resources. Commodities are typically produced goods that may be owned by the consumer, while services are generally produced goods that are merely rented by the consumer for a period of time.

2. The Concept of Utility

The concept of utility derives its roots from 19th century economic philosophy in that it was originally believes that one could measure the direct benefits of any economic activity to an individual. By being able to quantify the added satisfaction of an activity (or the lost satisfaction), economists would be able to recommend policies that would result in the greatest added utility for society as a whole.

While the concept of utility has taken its place as one of the cornerstones of modern economics, the attempt to measure utility has fallen by the wayside. Why? First, it is impossible to truly quantify the added utility from consuming anything (how many utils is one hamburger? Two? Fifteen?). Second, it is improbable that all individuals could satisfactorily order every possible bundle of economic goods so that their benefit could be determined. Finally, individual valuations are completely subjective, that is, the benefit I derive from an airport is completely different and can not be compared to your benefit from the airport.

This being said, we can still use the concept of utility in economics to illustrate the underlying principles of consumer behavior.

2.1 Total and Marginal Utility

This being said, we need to differentiate between the concepts of total and marginal utility. Recall that economics is primarily concerned with decisions made at the margin, that is, what is the effect of an additional scoop of ice cream, one less cup of coffee, one more dollar of pollution control.

Total utility is the sum of the utility derived from consuming each unit of the good in question. Marginal utility, on the other hand, is the utility derived from the last unit consumed.

For example, if we assume that we can measure utility in dollar terms, then we can illustrate the concepts of total and marginal utility. Assume that you haven't eaten for several days and wander into a restaurant that only serves chicken soup. Now, as illustrated in Table 1, you would be willing to pay \$2 for the first bowl of soup, but less than \$2 for the second, and so on. Why? Because the satisfaction that you derive from each additional bowl of soup that you eat declines.

Table 1
Bowl of Chicken Soup

Quantity	Price	Total Utility	Marginal Utility
1	\$2	\$2	\$2
2	\$1.75	\$3.75	\$1.75
3	\$1.50	\$5.25	\$1.50
4	\$1.00	\$6.25	\$1.00
5	\$0.60	\$6.85	\$0.60
6	\$0.15	\$7.00	\$0.15
7	\$0.02	\$7.02	\$0.02
8	-\$0.50	\$6.72	-\$0.50

As also illustrated in Table 1, marginal utility is equal to the price you pay for the last unit consumed. And, marginal utility can become negative. For example, let's say that after seven bowls, you no longer desire to consume any more soup. That is, you would derive any more utility from an 8th bowl of soup. But, assume that the owner has one bowl left and is unwilling to let it go to waste, so he pays you \$0.50 to consume the 8th bowl of soup. Your overall utility declines and

marginal utility is negative.

2.2 Law of Diminishing Marginal Utility

We have already discussed the law of diminishing marginal returns with respect to production, so we can now apply this law to the concept of marginal utility.

The law of diminishing marginal utility: The marginal utility from consuming equal units of a good eventually declines as the amount consumed increases.

3. Consumer Equilibrium and Demand

How does the concept of utility enter into consumer demand and equilibrium? Recall that decisions are made in the margin, and that consumers will wish to maximize their individual utility subject to their constraints (budget, time, labor, etc).

So, given a set of resources, each individual will seek to maximize the utility that they derive from consumption. Thus, if you are consuming 10 gallons of milk a month and 3 gallons of ice cream, and you would derive a higher utility from consuming 9 gallons of milk and 4 gallons of ice cream, then it would be in your interest to reallocate your consumption to 9 gallons of milk and 4 gallons of ice cream (under certain assumptions).

Thus, all consumer decisions are made in the margin and consumers will maximize their utility until the last dollar spent generates the same amount of marginal utility on every good.

3.1 Maximizing Utility

If we could observe each individual's utility, then we would merely have to select the consumption bundle that maximizes utility. In the margin, this would mean that the marginal utility derived from the last unit of each good consumed would have to be equal. Furthermore, since goods are not costless, we would have to expand this statement so that the marginal utility derived from the last dollar spent on each good is equal.

What does this mean? Simply put, the utility that you would derive from the last dollar you spent on clothes, food, movies, etc would have to be equal for utility to be maximized. If not, you could take away one dollar of spending on one item, and spend it on another item and increase your overall utility.

This principle is called the principle of equal marginal utilities per dollar.

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The principle of equal marginal utilities per dollar: A consumer maximizes utility when the last dollar spent on any good generates the same amount of utility as the last dollar spent on every other good.

Mathematically, individuals are in equilibrium when:

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \dots = \frac{MU_x}{P_x} \quad (1)$$

where a, b, ..., x are the various goods purchased and consumed. Furthermore, we can use Equation 1 to make the following observation:

$$\frac{MU_a}{MU_b} = \frac{P_a}{P_b} \quad (2)$$

That is, the marginal benefits for every good are proportional to their relative market prices. The left hand side of Equation 2 is equal to the demand price placed on A in terms of B and the right hand side is equal to the ratio of the market prices.

If market prices are greater than demand prices (see Chapter 1) then the person will not purchase the good. Conversely, if market prices are less than or equal to market prices, the person will purchase the good. In equilibrium, these ratios must be equal for all the goods you purchase, else you could rearrange your purchases to increase your utility.

3.2 Price Adjustments and Marginal Utility

What impact do changes in prices have on marginal utility? If the price of one good falls (increases), the marginal utility per dollar falls (increases). Thus, as the price of one good increases, the utility you derive at the marginal increases.

Why? Recall, everyone has a fixed budget constraint, in other words, no one has a infinite amount of money to spend. As the price of a good increases, your ability to consume the good declines since it costs more, that is, as the market price of a good increases the relative price of the good also increases, all else remaining equal.

Since the relative price of the good has increased, you will invariably consume less of the

good, thus while your total utility will decline, the marginal utility for the last good you consume will increase.

3.3 Substitution Effects

Recall from our previous discussion on relative prices and demand that as the relative price of a good increases, consumers will demand less of the good and substitute other goods for it.

We can more formally define the substitution effect as:

The substitution effect is that portion of the change in quantity demanded due solely to a change in relative prices.

We will discuss this issue further in the last section of this chapter.

3.4 Income Effects

As prices change, your ability to purchase goods and services also changes. If, for example, the price of milk declines 50%, you will have the ability to purchase the same amount of milk you are consuming at the current price and still have money left over to increase your purchases of other goods. This is known as an income effect.

Income effects are adjustments people make because the purchasing power of a given income when prices change.

We will discuss this issue further in the last section of this chapter.

3.5 Consumer Surplus

You might notice that when you purchase goods, that you usually pay one price for a number of units, that is, you pay \$1 for each gallon of gasoline that you purchase, \$2 for each gallon of milk, and so on. If you bought 5 cans of soup, you would not pay \$2 for the first can, \$1.75 for the second can, and so on, you would merely pay \$0.60 a can.

Recall that an individual's demand curve is based upon their subjective valuation of the economic good in question. The individual would be willing to pay \$2 for the first can of soup, \$1.75 for the second can, and so on, which is illustrated in the following table.

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Quantity	Individual Price	Market Price	Consumer Surplus
1	\$2	\$0.60	\$1.40
2	\$1.75	\$0.60	\$3.15
3	\$1.20	\$0.60	\$3.75
4	\$0.80	\$0.60	\$3.95
5	\$0.60	\$0.60	\$3.95

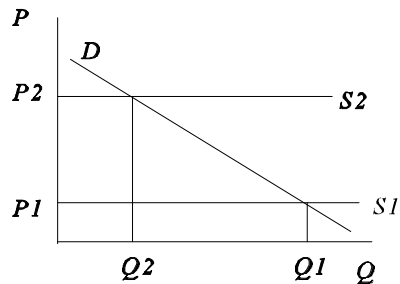
What is illustrated here is the concept of consumer surplus, where consumer surplus is the difference between the amount an individual would be willing to pay for various amounts of a specific good and the amounts they pay at market prices.

Consumer surplus is roughly equal to the area underneath the demand curve assuming that the income effect is minimal.

3.6 Paradox of Value

We close this section by examining the paradox of value. The paradox of value is:

Why are absolute necessities (water, food) prices cheaply, while luxury items (furs, diamonds) highly priced and highly demanded?



This paradox is usually answered by examining the demand for water. In most developed nations, water is abundant, that is, in large supply.

In the graph, S1 is the supply curve for water. The large abundance of water means that the marginal utility of water is extremely low, thus on a whole, the marginal valuation of water is quite low.

Now, suppose that water was in extremely short supply as evidenced by supply curve S2. Now, since there is not much water, the marginal utility of water is quite high as evidenced by price P2.

The paradox of value is resolved by observing the marginal utilities of the respective products. In the case of necessities, these goods are often in abundance, hence, their price, and marginal utility is quite low. In the case of luxuries, these goods are often scarce, hence their marginal utility and price are quite high.

4. Information and Rational Choice

Why do consumers purchase goods? In this section, we explore some of the rationales that economics has come up with to explain consumption patterns and decisions.

4.1 Goods as Bundles of Attributes

Economic goods consist of bundles of characteristics. Hamburgers may be relatively cheaper and quick but also contain many calories. As it is frequently said, “Anything that tastes good is bad for you.”

Since economic goods have a multitude of results, how consumers decide to consume what is a complicated process.

4.2 Uncertainty and Imperfect Information

What we do know is that perfect information does not exist. Since perfect information does

not exists, there exists an element of uncertainty in any economic decision.

To reduce uncertainty, one can obtain more and more information about the decision in question. Of course, there is a cost to obtaining information, and so, individuals only seek information as long as the expected benefits of the information outweigh the expected costs.

For example, if you were going to buy stock a company, you would like to conduct some research. However, if you believed that the stock would rise \$1, you would not pay more than \$1 for information on the stock.

4.3 Quality and Prices

One other interesting facet of markets is that individuals will pay a premium for an economic good. Tips are a classic example of a premium, and bribes can also represent a premium.

Why does this occur?

A premium is an example of an informal insurance policy to ensure that the good being purchase is of sufficient quality to warrant the premium. In the case of tips, you are providing an incentive for the server to bring you the food as quickly as possible while retaining the aspects of food quality that are necessary for you to enjoy the meal.

5. Asymmetric Information

Asymmetric information occurs when people have different levels of knowledge about a bargaining situation.

For example, if you purchase a computer and you go to one store without research, the store has the “edge” in that they are more knowledgeable about the market and prices than you are. However, if you go online and conduct research and find out the prices of competitors, then you may have as much, or more information than the retailer.

We can classify asymmetric information into two categories: moral hazard and adverse selection.

5.1 Moral Hazard

Moral hazard is a situation where time plays an important element in the transaction process.

For example, one problem in sports is athletes who receive guaranteed contracts. Studies have shown that the year after a contract is issued, performance declines significantly. The athlete has the ability to change his/her performance without danger of influencing the monetary contract.

This type of behavior is characteristic of moral hazard.

A moral hazard occurs when one party to a contract can unexpectedly raise the costs or lower the benefits to the other party, who cannot perfectly monitor or control the first party's actions.

Health insurance is another example of moral hazard. If you have full coverage, then you are likely to engage in riskier behavior knowing that your medical costs are covered.

5.2 Adverse Selection

Adverse selection occurs when one bargaining party ultimately suffers unexpected disadvantages because the other party conceals information prior to contract.

Adverse selection is the reason that insurance companies have 'pre-existing' condition riders on their policies and why contract law has become so complicated. In each case, individuals and companies are seeking to minimize their exposure in the case a party to a contract withholds information.

In the cases of adverse selection and moral hazard, uncertainty presents opportunities for individuals to exploit other individuals to increase their personal profit (companies also). This uncertainty can be reduced by research and requiring prospective clients to meet rigid information standard which are enforced by contract law.

6. Indifference Curve Analysis

We now turn to a more in-depth examination of consumer choice through the use of indifference analysis.

The first step of indifference analysis is to develop a methodology to portray an individual's budget constraint, that is, how do we graphically illustrate how much an individual can consume of various goods?

We can use a budget line to illustrate an individual's budget constrain, where a budget line is a line depicting the consumption possibilities of two good given an individual's resources.

Let us assume that an individual consumes two goods, milk and a composite good. The composite good merely represents all the other goods the individual consumes. This approach will allow us to illustrate the basic results that we have already discussed earlier in this chapter.

More formally, we can write an individual's budget constraint as:

$$Y = P_m \text{ Milk} + P_c \text{ Composite} \quad (3)$$

that is, the individual's income (Y) is fully expended on the consumption of milk (M) and the composite good (C). This means that if the individual wants to consume more milk, they must give up some consumption of the composite good.

We can modify Equation 3 to solve for the purchases of the composite good given purchases of milk or:

$$C = \frac{Y}{P_c} - \frac{P_m}{P_c} M \quad (4)$$

Equation 4 allows us to graphically depict the individual's budget line. Assume that the individual has total resources equal to \$2,000 and the Price of Milk is \$2 a gallon and the price of the composite good is equal to \$1 a unit.

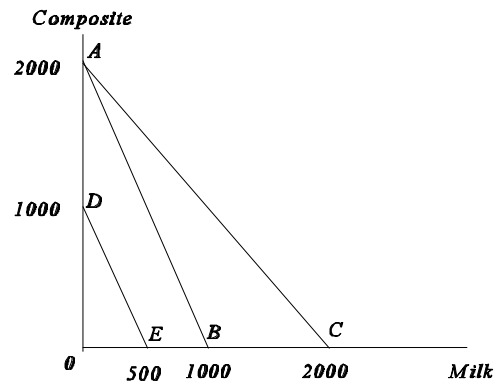
If you note, Equation is in slope-intercept format. That is, the y intercept is the first part of Equation 4 (Y/P_c) and the slope of the budget line is (P_m/P_c).

The slope of the line is: $(P_m / P_c) = (2 / 1)$

The y-intercept is $(Y / P_c) = (\$2,000 / \$1) = 2,000$ units

The x-intercept is merely $(Y / P_m) = (\$2,000 / \$2) = 1,000$ units

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This is illustrated above by the line running from point A to point B. Note that when 0 gallons of milk are consumed, that consumption equals 2,000 units of the composite good, and when 0 units of the composite good are consumed that consumption equals 1,000 units of milk.

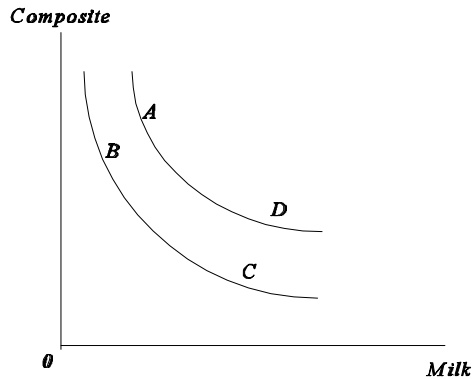
Now, what happens if income changes? Let's assume that the individual's income is only \$1,000 and all else remains equal. The budget line shifts to the line running from point D to point E. Note that since prices have not changed that the budget line's slope does not change.

What happens if the price of one good changes and all else remains equal? Assume that the price of milk declines to \$1 a gallon. This changes the x-intercept of the budget line (the point where 0 units of the composite good are consumed) from 1,000 to 2,000 units. This is illustrated by the budget line running from point A to point C. The slope of the line changes to $-1 = (P_m/P_c)$.

6.1 Indifference Curves

At the heart of indifference curve analysis is the recognition that there exists a multitude of bundles among which the consumer is indifferent in terms of utility, that is, if we hold utility constant, there exists a variety of packages of goods that are equally satisfying to the consumer.

We can graphically represent this principle through the use of indifference curves, where indifference curves reflect a consumer's preferences and connect all bundles of goods between which the consumer is indifferent.



The figure above can be used to illustrate the concept of indifference curves. Assume that we can map the bundles of goods among which the consumer is indifferent. Along the curve represented by points A and D, the consumer is indifferent to how proportion of the composite good and milk they consume. They could consume more of the composite and less milk (point A) or more milk and less of the composite (point D) and their utility would remain constant.

Higher indifference curves represent higher utility, that is, the curve AD represents a higher level of utility than curve BC. Lower indifference curves therefore represent lower levels of utility.

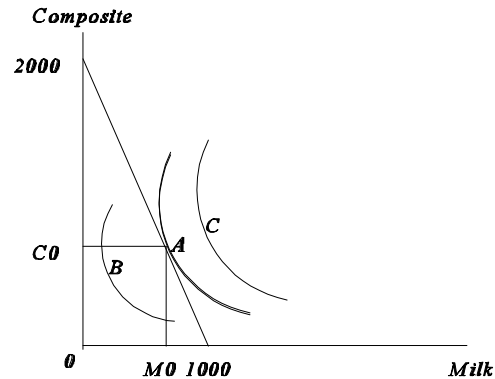
Indifference curves have certain important properties:

1. Every possible combination of goods can be represented by an indifference curve.
2. Indifference curves are negatively sloped due to the law of diminishing marginal utility.
3. Indifference curves farther from the origin represent higher utility.
4. Indifference curves never intersect.
5. The slope of an indifference curve represents the marginal utilities of the goods.
6. Indifference curves are convex due to diminishing relative marginal utilities.

6.2 Consumer Equilibrium

We can now combine the budget curve with the indifference curve to develop the concept of consumer equilibrium.

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When we put the budget curve together with the indifference curves, we obtain a graphical representation of consumer equilibrium.

Equilibrium occurs when the indifference curve is tangential to the budget curve at Point A. At this point the slope of the budget curve is equal to the slope of the indifference curve or:

$$-\frac{MU_m}{MU_c} = -\frac{P_m}{P_c} \quad (5)$$

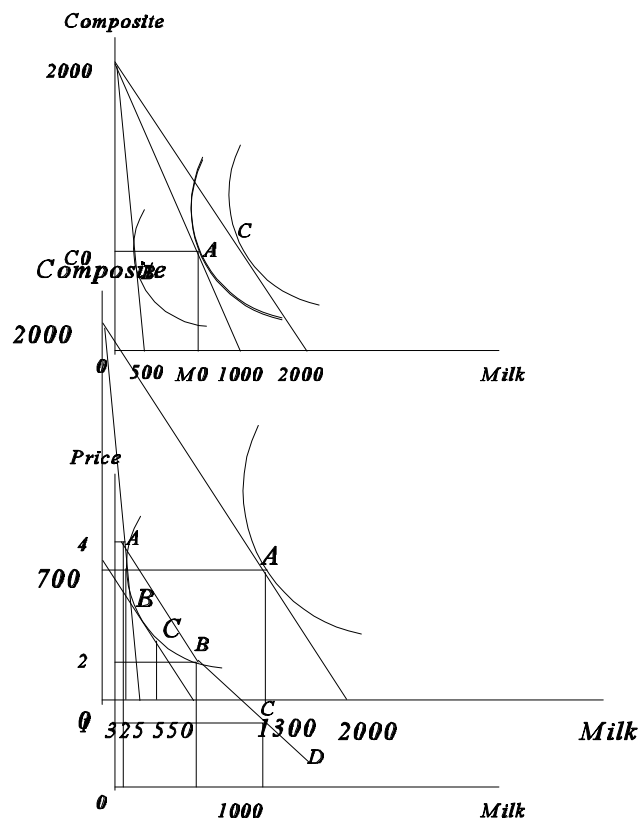
$$-\frac{MU_m}{P_m} = -\frac{MU_b}{P_b} \quad (6)$$

Note that this is the same equilibrium condition that we previously discussed.

Some points to consider. If we were at point B, we are not fully spending our resources and therefore could purchase more goods and move to the indifference curve of which point A is a part. We would like to move further out to point A but this indifference curve can not be attained since we do not have sufficient resources to purchase any of the combinations of goods that lie on this indifference curve.

6.3 Deriving Individual Demand Curves

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We can use the preceding analysis to derive the individual demand curve for the consumer. Note that we have allowed the price of milk to vary with all else remaining equal. When the price of milk increases, the budget curve pivots inward, and when the price decreases, the budget curve pivots outward.

At \$4 a gallon, the maximum amount of milk that could be consumed would be 500 gallons (\$2000/\$4). The indifference curve is tangential at point B on the upper graph. We can transfer this information below to illustrate how much milk the consumer demands at \$4. We can then repeat this analysis for \$2 a gallon and \$1 a gallon to trace out the individual demand curve.

6.4 Income and Substitution Effects

The final part of this chapter (and this section) is the decomposition of changes in demand into income and substitution effects. Recall that as a good becomes more expensive (cheaper), demand will change because of two reasons. If the good is relatively more expensive (cheap), consumers will choose to consume more (less) of relatively cheaper products that are similar to the good in question

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(substitution effect). Also, if the good is more expensive (cheap), then more (less) of the budget is required to consume the same amount of the good, thus the amount to consume other goods declines (increases).

Assume that we are initially have \$2,000 in resources, that $P_m = \$4$ and $P_c = \$1$. At this equilibrium, we consume 700 units of the composite good and 325 gallons of milk (Point B).

Now, assume the price of milk falls to \$1 a gallon. The equilibrium shifts to Point A and 1300 units of milk and 700 units of the composite good are now consumed.

The substitution effect is found by drawing a line parallel to the new budget curve and having that line intersect the old indifference curve. This in effect holds purchasing power constant (as if price and income fell). The substitution effect is from 325 to 550 gallons of milk (Point C is the constant purchasing power equilibrium) and the income effect is what remains or from 550 gallons to 1300 gallons of milk.

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When Albert Einstein died, he met three New Zealanders in the queue outside the Pearly Gates. To pass the time, he asked what were their IQs. The first replied 190. "Wonderful," exclaimed Einstein. "We can discuss the contribution made by Ernest Rutherford to atomic physics and my theory of general relativity". The second answered 150. "Good," said Einstein. "I look forward to discussing the role of New Zealand's nuclear-free legislation in the quest for world peace". The third New Zealander mumbled 50. Einstein paused, and then asked, "So what is your forecast for the budget deficit next year?"